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APPELLANTS' BRIEF Address to: Mail Stop Appeal Brief-Patents Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	Attorney Docket No.	10991398-1
	Confirmation No.	5729
	First Named Inventor	ILSLEY, DIANE D.
	Application Number	09/919,643
	Filing Date	July 31, 2001
	Group Art Unit	1639
	Examiner Name	Liu, Sue Xu
	Title: "Methods For Depositing Small Volumes Of Protein Fluids Onto The Surface Of A Substrate"	

Sir:

This Brief is filed in support of Appellants' appeal from the Examiner's Rejection dated August 22, 2007, and the Advisory Action dated February 14, 2008. No claims have been allowed. Claims 1, 2, 4-10, 12-28, and 35-39 are pending and appealed herein. A Notice of Appeal was filed on February 14, 2008.

The Board of Appeals and Interferences has jurisdiction over this appeal pursuant to 35 U.S.C. §134.

The Commissioner is hereby authorized to charge deposit account number 50-1078, reference no. 10991398-1 to cover the fee required under 37 C.F.R. §41.20(b)(2) for filing Appellants' brief. In the unlikely event that the fee transmittal or other papers are separated from this document and/or other fees or relief are required, Appellants petition for such relief, including extensions of time, and authorize the Commissioner to charge any fees under 37 C.F.R. §§ 1.16, 1.17 and 1.21 which may be required by this paper, or to credit any overpayment, to deposit account number 50-1078, reference no. 10991398-1.

TABLE OF CONTENTS

REAL PARTY IN INTEREST

The inventors named on this patent application assigned their entire rights to the invention to Agilent Technologies, Inc.

RELATED APPEALS AND INTERFERENCES

There are currently no other appeals or interferences known to Appellants, the undersigned Appellants' representative, or the assignee to whom the inventors assigned their rights in the instant case, which would directly affect or be directly affected by, or have a bearing on the Board's decision in the instant appeal.

STATUS OF CLAIMS

The present application was filed on July 31, 2001 with Claims 1-34. During the course of prosecution, Claims 35-39 were added, and Claims 3, 11, and 29-34 were cancelled. Accordingly, Claims 1, 2, 4-10, 12-28, and 35-39 are pending in the present application, all of which stand rejected. All of the rejected claims are appealed herein.

STATUS OF AMENDMENTS

No amendments to the claims were filed subsequent to issuance of the Final Rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention is drawn to methods for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate.

Below is a description of each independent and separately argued dependent appealed claim and where support for each such claim can be found in the specification.

Claim 1 claims a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising:

(a) front loading said quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein said front loading comprises contacting said orifice with said fluid in a manner so that said fluid flows through said

orifice into said firing chamber, wherein said quantity of fluid is no more than about 5 μl;

(b) positioning said loaded thermal inkjet head in opposing relation to said surface; and

(c) actuating said thermal inkjet head to deposit said quantity of fluid onto said surface in a manner that maintains said reagent's functionality. (see specification for example at p. 3, lines 13-23; p. 4, lines 9-22; p. 5, lines 3-4; p. 6, lines 10-27).

Claim 2 claims the method according to Claim 1, wherein said method further comprises applying back pressure to said head during said contacting step. (see specification, for example at p. 6, lines17-21)

Claim 6 claims the method according to Claim 1, wherein said method further comprises washing said head following said actuating step (c). (see specification, for example, p. 11, lines 23-29)

Claim 8 claims the method according to Claim 1, wherein said protein of interest is an enzyme. (see specification, for example at page 4, lines 20-22).

Claim 12 claims a method for depositing a quantity of fluid containing a protein reagent binding pair member onto a substrate surface, the method comprising:

(a) front loading less than about 5 μl of said fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein said front loading comprises contacting said orifice with said fluid and applying back pressure to said head during said contacting in a manner so that said fluid flows through said orifice into said firing chamber;

(b) positioning said loaded thermal inkjet head loaded with said fluid in opposing relation to said surface;

(c) actuating said thermal inkjet head to deposit said quantity of fluid onto said surface in a manner that maintains said reagent's functionality; and

(d) washing said head. (see specification, for example at p. 3, lines 13-23; p. 4, lines 9-22; p. 5, lines 3-4; p. 6, lines 10-27; p. 8, lines 16-23; p. 11, lines 23-29).

Claim 17 claims a method for depositing a quantity of fluid containing an enzyme reagent onto a surface of a substrate, said method comprising:

(a) front loading less than about 5 μl of said fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein said front loading comprises contacting said orifice with said fluid and applying back pressure to said head during said contacting in a manner so that said fluid flows through said orifice into said firing chamber;

(b) positioning said loaded thermal inkjet head loaded with said fluid in opposing relation to said surface;

(c) actuating said thermal inkjet head to deposit said quantity of fluid onto said surface in a manner that maintains said reagent's functionality; and

(d) washing said head. (see specification, for example at p. 3, lines 13-23; p. 4, lines 9-22; p. 5, lines 3-4; p. 6, lines 10-27; p. 11, lines 23-29)

Claim 22 claims a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising:

(a) front loading said fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein said protein of interest is present in said fluid at a concentration that ranges from about 5 to 1000 μg/ml and said front loading comprises contacting said orifice with said fluid and applying back pressure to said head during said contacting in a manner so that said fluid flows through said orifice into said firing chamber;

(b) positioning said loaded thermal inkjet head in opposing relation to said surface; and

(c) actuating said thermal inkjet head to deposit said quantity of fluid onto said surface in a manner that maintains said reagent's functionality. (see specification, for example at p. 3, lines 13-23; p. 4, lines 9-26; p. 5, lines 3-4; p. 6, lines 10-27)

Claim 23 claims the method according to Claim 22, wherein said method further comprises washing said head following said actuating step (c). (see specification, for example, p. 11, lines 23-29)

Claim 35 claims the method according to Claim 2, wherein said back pressure comprises negative pressure (see specification, for example at p. 6, lines 17-21).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

I. Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 have been rejected under 35 U.S.C. § 102(a) and 35 U.S.C. § 102(e) as being anticipated by Caren et al. (U.S. Patent 6,221,653).

II. Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 have been rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Caren et al. (U.S. Patent 6,797,469).

III. Claims 1, 2, 4-10, 12-28, and 35-39 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by, or alternatively, under 35 U.S.C. § 103(a) as obvious over Deeg et al. (U.S. Patent 5,338,688).

IV. Claims 1, 2, and 9 have been rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 19-21 and 23 of Caren et al. (U.S. Patent 6,797,469).

V. Claims 1, 2, and 9 have been rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 1, 3, 5-7, 9, 10, 12, 17, and 19 of Caren et al. (U.S. Patent 6,221,653).

VI. Claims 1, 2, and 9 have been rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 1, 5, 9, 11-13, 15, and 18 of Caren et al. (U.S. Patent 6,656,740).

VII. Claims 1, 2, 6, 7, and 8 have been rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 1-5, 7, and 11-19 of Caren et al. (U.S. Patent 6,323,043) and Claims 1, 2, 4, and 6 of Caren et al. (U.S. Patent 6,884,580)

VIII. Claims 1,2, and 4 have been rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 1, 3, 8, 12, 14, 15, and 18 of Schleifer et al. (U.S. Patent 6,242,266).

ARGUMENT

I. Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 are not anticipated under 35 U.S.C. § 102(a) and 35 U.S.C. § 102(e) by Caren et al. (U.S. Patent 6,221,653).

In the arguments set forth below, the Appellants will argue the rejected claims in one group.

As described above, independent Claim 1 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid in a manner so that the fluid flows through said orifice into the firing chamber, wherein the quantity of fluid is no more than about 5 μl; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

Independent Claim 12 is drawn to a method for depositing a quantity of fluid containing a protein reagent binding pair member onto a substrate surface, the method comprising front loading less than about 5 μl of the fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid and applying back pressure to the head during the contacting in a manner so that the fluid flows through said orifice into the firing chamber; positioning the loaded thermal inkjet head loaded with the fluid in opposing relation to the surface; actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality; and washing the head.

Independent Claim 17 is drawn to a method of a method for depositing a quantity of fluid containing an enzyme reagent onto a surface of a substrate, said method comprising front loading less than about 5 μl of the fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid and applying back pressure to the head during the contacting in a manner so that the fluid flows through the orifice into the firing chamber; positioning the loaded thermal inkjet head loaded with the fluid in opposing relation to the surface; actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality; and washing the head.

An element of all three independent claims is depositing a quantity of fluid containing a protein reagent of interest (e.g. an enzyme) in a manner that retains the deposited reagent's functionality.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

The standard for anticipation under section 102 is one of strict identity. An anticipation rejection requires a showing that each limitation of a claim be found in a single reference, Atlas Powder Co. v. E.I. DuPont de Nemours & Co., 224 U.S.P.Q. 409, 411 (Fed. Cir. 1984). Further, an anticipatory reference must be enabling, see Akzo N.V. v. United States Int'l Trade Comm'n 808 F.2d 1471, 1479, 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986), cert denied, 482 U.S. 909 (1987), so as to place one of ordinary skill in possession of the claimed invention. To anticipate a claim, a prior art reference must disclose every feature of the claimed invention, either explicitly or inherently. Glaxo v. Novopharm, Ltd. 334 U.S. P.Q.2d 1565 (Fed. Cir. 1995).

The Examiner has rejected the claims of this Group as being anticipated by the Caren '653 patent. In making this rejection, the Examiner asserts that '653 teaches each and every element of the claims.

For the reasons detailed below, the Appellants submit that '653 fails to anticipate the claimed invention. Specifically, the Appellants submit that '653 fails to teach, either expressly or inherently, the method of depositing a quantity of fluid containing a protein reagent, or protein reagent binding pair of interest onto a surface of a substrate, as is claimed.

In the Advisory Action of February 14, 1008, the Examiner asserts that Caren '653 teaches these elements and anticipates the claimed invention. In maintaining this rejection, the Examiner states that Caren '653 teaches "the deposit fluid comprises binding agents (a member of a specific binding pair) such as proteins, enzymes and cell lysates (containing essentially protein mixtures) (e.g. Claim 3; Column 2, lines 28+; col. 4 lines 27+) which reads on the protein reagent of clms 1, 7, 8, 12, 17, 22, 24, 25, and 36, 38." (Advisory Action, p. 2).

However, as discussed in the previous response, the above cited sections by the Examiner demonstrate that the fluid sample in Caren '653 is one that is suspected of containing an analyte of interest; i.e., a fluid sample that may or may not actually contain the analyte of interest. It is not a protein reagent as claimed.

A reagent is defined as follows: "a substance used in a chemical reaction to detect, measure, examine, or produce other substances." (American Heritage Dictionary). In other words, a reagent as in the current claims is a substance, for example, used to detect the presence of an analyte. This is in contrast to an analyte, which is "a substance or chemical constituent that is undergoing analysis" (American Heritage Stedmans Medical Dictionary), e.g. a substance that is detected. The Examiner has not pointed to where '653 discloses deposition of a reagent. Nowhere does Caren '653 disclose deposition of a protein reagent onto a substrate; i.e., a substance used in a chemical reaction to detect, measure, examine, or produce other substances, in a manner that maintains said reagent's functionality.

Turning to the Examiner's references cited above, Claim 3 refers to a method for depositing a quantity of fluid on a substrate, wherein the fluid is a biomolecule. Col. 2,

defines the term "binding agent" on the array; and Col. 4, lines 27+, discloses that "[t]he fluid sample is generally derived from a physiological fluid, e.g. naturally occurring fluids, such as plasma, tears, urine, etc., derivatives of cells or tissues, e.g. cell lysates, etc., where the fluid may or may not be pre-treated to produce the sample". None of these citations from '653 disclose deposition of a protein reagent onto a substrate. The Appellants therefore fail to see how these references support the Examiners assertion that '653 contains the element of depositing a reagent.

The Examiner asserts that the "Applicants' definition for the term "reagent" is broad and encompasses the protein containing "fluid" of the Caren reference, because Caren teaches the "fluid" comprise agents for binding, i.e. "used in a chemical reaction to detect, measure..." according to applicant's provided definition" (Advisory Action, p. 3)

The Appellants respectfully disagree with this assertion. The Examiner appears to be equating "binding agent" with reagent. The Appellants point out that "binding agent" is a member of a specific binding pair, which is not the same as a substance used to detect or examine another substance. Furthermore, even if the Examiner considers all binding agents to be "reagents", the binding agents of '653 are located on the array, and therefore are not deposited onto a surface of the substrate, as in the current claims.

In contrast to the current claims, Caren '653 is directed to deposition of sample, not reagent, on an array. The deposition of sample on an array in Caren '653 is for detection of the presence of an analyte in a sample. As described in the specification, "[T]he fluid sample that is deposited on the array according to the subject invention is a fluid sample that is suspected of containing an analyte of interest. In other words, the fluid sample may or may not actually contain the analyte of interest, where the purpose of the array-based assays in which the methods of the subject invention find use is to determine whether or not the sample has the analyte of interest." (col. 4, lines 10-17). A sample to be assayed is not a protein reagent as claimed.

The Examiner further asserts that:

> "Applicants also provided recitation from the instant specification (Reply, p. 7, para 5) for the process of sample analysis. However, the specific method steps are not recited in the instant claims. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "The fluid sample that is deposited on the array according to subject invention is a fluid sample that is suspected of containing an analyte of interest...:(Reply, p. 7, para 5) are not recited in the rejected claims (Advisory Action, p. 3)"

However, the Appellants note that the Examiner is mistaken, and has misread the response of October 22, 2007. The citation referred to is not from the current specification, but is from Caren '653. Furthermore, the recitation provided in the previous reply and cited above was clearly identified as being from Caren '653, and not the instant specification. The citation is provided in support of the Appellants assertion that '653 is directed to deposition of sample, not reagent. Therefore, the feature of "a fluid sample that is suspected of containing an analyte of interest" is not recited in the rejected claims, because this is a feature disclosed in Caren '653.

The Appellants further note that the Examiner has alleged that "applicants have also made assertion about the reference's teaching such as "a fluid sample that may or may not actually contain the analyte of interest" without providing any supporting evidence. (Advisory Action, p. 3). Again, the Appellants note that the Examiner is mistaken. The supporting evidence for the statement that "a fluid sample that may or may not actually contain the analyte of interest" is a direct quote from the specification of Caren '653 (col. 4, lines 12-14), and was identified as such on p. 7 of the Appellants' response of 10-22-2007. The citation continues "...where the purpose of the array-based assays in which the methods of the subject invention find use is to determine whether or not the sample has the analyte of interest" ('653, col. 4, lines 14-17).

Additionally, the Examiner asserts that "Applicants have not demonstrated any substantive and genuine differences or distinction between the reference's teachings and the instant claimed invention. Furthermore, the instant specification does not provide a specific definition for terms such as "protein reagent" (which is cited in the preamble of the instant claims and construed as intended use) and "quantity of fluid".

The Appellants respectfully disagree. The instant specification is clear as to the meaning and use of the term "protein reagent". For example,

> "Accordingly, there is continued interest in the development of new protocols for use in the deposition of fluids containing proteins onto a substrate surface. Of particular interest would be the development of a protocol that ... allows the flexibility to change the protein solution deposited and deliver multiple reagents simultaneously. "(p. 2, lines 8-14)

And further:

> "The subject methods of depositing a volume of fluid sample onto the surface of a substrate find use in a variety of different applications, and are particularly suited for use in methods where reproducible placement of small volumes of a reagent onto the surface of a solid support are desired. As such, the subject methods find use in the preparation and manufacture of biosensors, microarrays, e.g., proteomic arrays, microfluidic devices, and the like. (p. 12, lines 28-p. 13, line 1)

And in Example IV:

> "... The slide is then scanned for covalently linked Cy5-dCMP to the DNA attached to the surface, indicating that the DNA polymerase synthesized DNA. The results show that multiple reagents may be deposited onto the surface using the subject methods. (p. 17, lines 6-9)

Furthermore, the Appellants point out the meaning of "reagent" is clear to those of ordinary skill in the art, and that information which is well known in the art need not be described in detail in the specification (*In re Buchner* 18 USPQ2d 1331, 1332 (Fed. Cir. 1991); Hybritech, Inc. v. Monoclonal Antibodies, Inc. 231 USPQ 81, 94 (Fed. Cir. 1986); and Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co. 221 USPQ 481, 489 (Fed. Cir. 1984)).

The Examiner has further asserted that the instant specification does not provide a specific definition for terms such as "quantity of fluid". However, the Appellants respectfully disagree. As cited below, the instant specification is clear as to the meaning of a "quantity of fluid":

> "In practicing the subject methods, the thermal inkjet device is front loaded with a fluid sample containing the one or more proteins of interest. Because the methods are methods of efficiently depositing a volume or quantity of fluid onto a surface, such that the amount of fluid required is small and most efficiently and effectively utilized, a front loading procedure is typically employed for loading the fluid into the head." (p. 6, lines 10-15)

And further:

> "Following front loading of the inkjet head, the head is employed to deposit an extremely small quantity of a fluid sample, e.g., a pico liter volume of fluid sample, onto the surface of a substrate. As the subject methods are capable of depositing an extremely small volume of fluid onto a substrate surface, the subject methods can be used to deposit a pico liter quantity of fluid onto an array surface. By "pico liter quantity" is meant a volume of fluid that is at least about 0.1 pl, usually at least about 1 pl and more usually at least about 10 pl, where the volume may be as high as 250 pl or higher, but generally does not exceed about 100 nL and usually does not exceed about 1μl." (p. 6, line 28-p. 7, line 6)

Additionally, the Appellants refer the Examiner to the limitation in Claim 28, for example, "wherein said deposited does not exceed about 200 picolitres". The Appellants therefore maintain that the instant specification and claims do, in fact, provide a specific definition for terms such as "quantity of fluid".

Therefore, because Caren '653 does not teach the method of depositing a quantity of fluid containing a protein reagent, or protein reagent binding pair of interest onto a surface of a substrate, Caren '653 does not anticipate the rejected claims.

In view of the discussion above, the Appellants submit that Caren '653 fails to anticipate Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38, and respectfully request reversal of the rejection.

II. Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 are not anticipated under 35 U.S.C. § 102(e) by Caren et al. (U.S. Patent 6,797,469).

In the arguments set forth below, the Appellants will argue the rejected claims in one group.

As described above, independent Claim 1 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid in a manner so that the fluid flows through said orifice

into the firing chamber, wherein the quantity of fluid is no more than about 5 μl; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

Independent Claim 12 is drawn to a method for depositing a quantity of fluid containing a protein reagent binding pair member onto a substrate surface, the method comprising front loading less than about 5 μl of the fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid and applying back pressure to the head during the contacting in a manner so that the fluid flows through said orifice into the firing chamber; positioning the loaded thermal inkjet head loaded with the fluid in opposing relation to the surface; actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality; and washing the head.

Independent Claim 17 is drawn to a method of a method for depositing a quantity of fluid containing an enzyme reagent onto a surface of a substrate, said method comprising front loading less than about 5 μl of the fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid and applying back pressure to the head during the contacting in a manner so that the fluid flows through the orifice into the firing chamber; positioning the loaded thermal inkjet head loaded with the fluid in opposing relation to the surface; actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality; and washing the head.

An element of all three independent claims is depositing a quantity of fluid containing a protein reagent of interest (e.g., enzyme) in a manner that retains the reagent's functionality.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053

(Fed. Cir. 1987).

The standard for anticipation under section 102 is one of strict identity. An anticipation rejection requires a showing that each limitation of a claim be found in a single reference, Atlas Powder Co. v. E.I. DuPont de Nemours & Co., 224 U.S.P.Q. 409, 411 (Fed. Cir. 1984). Further, an anticipatory reference must be enabling, see Akzo N.V. v. United States Int'l Trade Comm'n 808 F.2d 1471, 1479, 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986), cert denied, 482 U.S. 909 (1987), so as to place one of ordinary skill in possession of the claimed invention. To anticipate a claim, a prior art reference must disclose every feature of the claimed invention, either explicitly or inherently. Glaxo v. Novopharm, Ltd. 334 U.S. P.Q.2d 1565 (Fed. Cir. 1995).

The Examiner has rejected the claims of this Group as being anticipated by the Caren '469 patent. In making this rejection, the Examiner asserts that '469 teaches each and every element of the claims.

For the reasons detailed below, the Appellants submit that '469 fails to anticipate the claimed invention. Specifically, the Appellants submit that '469 fails to teach, either expressly or inherently, the method of depositing a quantity of fluid containing a protein reagent, as is claimed.

In the Advisory Action of February 14, 1008, the Examiner asserts that Caren '469 teaches these elements and anticipates the claimed invention. In making the rejection, the Examiner asserts that "[t]he reference further teaches the deposit fluid comprises binding agents (a member of a specific binding pair) such as proteins and (e.g. Claim 19; Column 2, lines 31+; col. 4 lines 33+,) which reads on the protein reagent of clms 1, 7, 8, 12, 17, 22, 24, 25, and 36-38." (Advisory Action, p. 4).

However, again the Appellants respectfully disagree. As discussed in the previous response of 10-22-2007, Caren (6,797,469) is directed to deposition of sample, not reagent, on an array. The cited portions of Caren '469 are directed to screening a fluid sample for the presence of an analyte in a sample; specifically a nucleic acid. As described in the specification, "[T]he fluid sample that is deposited on

the array according to the subject invention is a fluid sample that is suspected of containing an analyte of interest. In other words, the fluid sample may or may not actually contain the analyte of interest" (col. 4, lines 14-18). It is therefore not a protein reagent as claimed.

As discussed above, a reagent is defined as a substance used in a chemical reaction to detect, measure, examine, or produce other substances. In other words, a reagent as in the current claims is a substance, for example, used to detect the presence of a nucleic acid. This is in contrast to an analyte, (e.g. a nucleic acid) which is "a substance or chemical constituent that is undergoing analysis" (American Heritage Stedmans Medical Dictionary), e.g. a substance that is detected. The Examiner has not pointed to where '469 discloses deposition of a reagent. Nowhere does Caren '469 disclose deposition of a protein reagent onto a substrate in a manner that maintains the reagent's functionality.

Turning to the Examiner's references cited above, Claim 19 of Caren '469 is directed to "a method for depositing a quantity of fluid containing a nucleic acid or polypeptide onto an array surface having a plurality of nucleic acids or polypeptides stably associated therewith...." Col. 2, lines 31+ defines the term "binding agent"; and Col. 4, lines 33+, discloses that "[t]he fluid sample is generally derived from a physiological fluid, e.g. naturally occuring fluids, such as plasma, tears, urine, etc., derivatives of cells or tissues, e.g. cell lysates, etc., where the fluid may or may not be pre-treated to produce the sample". None of these citations from '469 disclose deposition of a protein reagent onto a substrate. The Appellants therefore fail to see how these references support the Examiners assertion that '469 contains the element of depositing a reagent.

The Appellants point out again that the Examiner appears to be equating "binding agent" with reagent. As discussed above, "binding agent" is a member of a specific binding pair, which is not the same as a substance used to detect or examine another substance. Furthermore, even if the Examiner considers all binding agents to be "reagents", the binding agents of '469 are located on the array, and therefore are not

deposited onto a surface of the substrate, as in the current claims.

In contrast to the current claims, Caren '469 is directed to deposition of sample, not reagent, on an array. The deposition of sample on an array in Caren '469 is for detection of the presence of an analyte in a sample. As described in the specification, "[T]he fluid sample that is deposited on the array according to the subject invention is a fluid sample that is suspected of containing an analyte of interest. In other words, the fluid sample may or may not actually contain the analyte of interest, where the purpose of the array-based assays in which the methods of the subject invention find use is to determine whether or not the sample has the analyte of interest." (col. 4, lines 10-17). A sample to be assayed is not a protein reagent as claimed.

Therefore, because Caren '469 does not teach the method of depositing a quantity of fluid containing a protein reagent, or protein reagent binding pair of interest onto a surface of a substrate, Caren '469 does not anticipate the rejected claims.

In view of the discussion above, the Appellants submit that Caren '469 fails to anticipate Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38, and respectfully request reversal of the rejection.

III. Claims 1, 2, 4-10, 12-28, and 35-39 are not anticipated under 35 U.S.C. § 102(b) by, or alternatively, are not obvious under 35 U.S.C. § 103(a) over Deeg et al. (U.S. Patent 5,338,688).

In the arguments set forth below, the Appellants will argue the rejected claims in Groups as follows:

Group 1A: Claims 1, 4, 5, 7-10, 36-39
Group 1B: Claims 2, 22, 24-28, 35
Group 1C: Claims 6, 23
Group 1D: Claims 12-21

Group 1A: *Claims 1, 4, 5, 7-10, 36-39*

As described above, independent Claim 1 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid in a manner so that the fluid flows through said orifice into the firing chamber, wherein the quantity of fluid is no more than about 5 μl; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

Independent Claim 12 is drawn to a method for depositing a quantity of fluid containing a protein reagent binding pair member onto a substrate surface, the method comprising front loading less than about 5 μl of the fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid and applying back pressure to the head during the contacting in a manner so that the fluid flows through said orifice into the firing chamber; positioning the loaded thermal inkjet head loaded with the fluid in opposing relation to the surface; actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality; and washing the head.

Independent Claim 17 is drawn to a method of a method for depositing a quantity of fluid containing an enzyme reagent onto a surface of a substrate, said method comprising front loading less than about 5 μl of the fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid and applying back pressure to the head during the contacting in a manner so that the fluid flows through the orifice into the firing chamber; positioning the loaded thermal inkjet head loaded with the fluid in opposing relation to the surface; actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality; and washing the head.

Independent Claim 22 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the protein of interest is present in the fluid at a concentration that ranges from about 5 to 1000 μg/ml and the front loading comprises contacting the orifice with the fluid and applying back pressure to the head during the contacting in a manner so that the fluid flows through the orifice into the firing chamber; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

An element of all four independent claims and the claims which depend from them is front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

The standard for anticipation under section 102 is one of strict identity. An anticipation rejection requires a showing that each limitation of a claim be found in a single reference, Atlas Powder Co. v. E.I. DuPont de Nemours & Co., 224 U.S.P.Q. 409, 411 (Fed. Cir. 1984). Further, an anticipatory reference must be enabling, see Akzo N.V. v. United States Int'l Trade Comm'n 808 F.2d 1471, 1479, 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986), cert denied, 482 U.S. 909 (1987), so as to place one of ordinary skill in possession of the claimed invention. To anticipate a claim, a prior art reference must disclose every feature of the claimed invention, either explicitly or inherently. Glaxo v. Novopharm, Ltd. 334 U.S. P.Q.2d 1565 (Fed. Cir. 1995).

The Examiner has rejected the claims of this Group as being anticipated by the Deeg patent. In making this rejection, the Examiner asserts that Deeg teaches or

suggests every element of the claims.

For the reasons detailed below, the Appellants submit that Deeg fails to anticipate the claimed invention. Specifically, the Appellants submit that Deeg fails to teach, expressly or inherently, front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber, as is claimed.

In making the rejection, the Examiner alleges that "[a]lthough the '688 patent does not explicitly teach the step of "front loading said quantity of fluid into a thermal inkjet head....", the claimed thermal inkjet head inherently performs "front loading" process. See MPEP 2112.02:"

> "Under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process." *In re King,* 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986) (p. 6-7, Advisory Action).

The Office further asserts that "whenever the inkjet head orifice, in its normal and usual operation, is in contact with a fluid, the inherent function of capillary suction (or "front loading") is necessarily performed by the inkjet head." (Advisory Action p. 7-8, emphasis original).

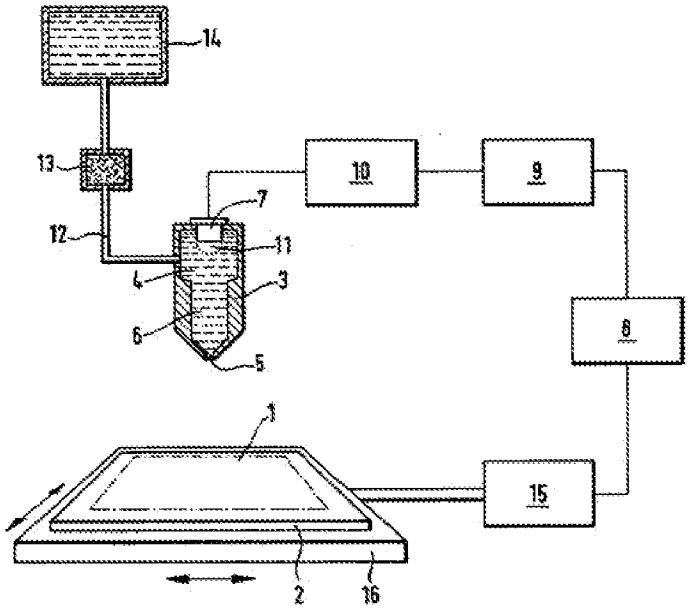
However, the Appellants argue that the inkjet head orifice of Deeg, in its normal and usual operation, does not necessarily perform the "inherent function of capillary suction" when in contact with a fluid. The inkjet orifice of Deeg does not necessarily perform the "inherent function of capillary suction" because the "normal and usual operation" of Deeg is to load analytical liquid into "disposable jet units" (i.e., cartridges) "which contain the analytical liquid (especially reagents or calibrating liquids) in prepacked form" which are then associated with the inkjet head (column 2, lines 22 to 25).

The Appellants maintain that in order to anticipate, the prior art reference "must describe the applicant's claimed invention sufficiently to have placed a person of ordinary skill in the field of the invention in possession of it." In re Spada, 911 F.2d 705, 708, 15 U.S.P.Q.2d (BNA) 1655, 1657 (Fed. Cir. 1990).

Establishing inherency requires that the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. . . . Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." Continental Can Co. v. Monsanto Co., 948 F.2d 1264, 1268-69, 20 U.S.P.Q.2d (BNA) 1746, 1749 (Fed. Cir. 1991) (quoting In re Oelrich, 666 F.2d 578, 581, 212 U.S.P.Q. (BNA) 323, 326 (C.C.P.A. 1981). In relying on this theory of inherency, one must "provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inf. 1990).

The Appellants contend that Deeg does not disclose the front loading of a fluid into an inkjet head. The methods disclosed by Deeg describe a traditional use of inkjet heads, where the fluid comes from a reservoir into the firing chamber, and therefore fluid does not go from the orifice into the firing chamber. The Appellants maintain that nowhere does Deeg teach front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber.

Deeg discloses the apparatus set forth in Fig. 1, below. As can be seen with reference to Fig. 1, element 3 represents the jet head, element 4 represents the jet chamber and element 14 represents a reservoir containing an analytical fluid 6 to be delivered to the surface of the substrate. Reservoir 14 is connected to jet chamber 4 via line 12, which is intersected by filter 13.



Deeg discloses that prior to printing, the analytical fluid 6 is delivered from the reservoir 14 to the jet chamber 4 wherein the fluid is heated by element 7 and ejected via orifice 5. Because the analytical fluid is delivered to the jet head 3 from the reservoir 14 via line 12, it is clear that the jet head 3 is not front loaded by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber. As previously discussed, if the Deeg apparatus were meant to be front loaded there would be no purpose for line 12, filter 13 and reservoir 14.

Therefore, the 'normal and usual operation' of the method disclosed in Deeg is the use of an "ink jet printing head working on the bubble jet principle" (col. 6, lines 58-59). Deeg states that the advantages of such a method include the ability "economically to manufacture disposable jet units which contain the analytical liquid (especially reagents or calibrating liquids) in prepacked form." (col. 2, lines 22-25) and "..a particular advantage of the invention is that it is possible to manufacture a jet unit at such a favorable cost that it can be designed as a disposable element containing a supply of analytical liquid ready for use (prepacked by the manufacturer)." (col. 4, lines 5-9).

From the above, it is clear that does Deeg not teach front loading of fluid into the

inkjet head, but instead teaches the use of "disposable jet units" (i.e. cartridges) in "prepacked form". Nowhere does Deeg teach front loading of a fluid into an inkjet head.

In response to the Appellants arguments that Deeg loads fluid through a reservoir, the Examiner alleges that:

> "The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain". (*In re Heck*, 699 F.2d 1331, 1332-33, 216 USPQ, 1039 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F. 2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968))." (Advisory Action, p. 8)

However, again the Appellants point out that since Deeg does not contain the element of front loading fluid, and furthermore, because the element of "front loading" is not inherent in the method of Deeg, the Examiner's citation of Deeg for all it contains is not relevant.

Therefore, the Appellants maintain that the Examiner has not provided "technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art" Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inf. 1990). In other words, the Examiner has not pointed to how front loading, where fluid flows from the orifice to the firing chamber, can be considered to be an inherent characteristic of Deeg, where the fluid flows in the opposite direction, from a reservoir into the firing chamber.

Therefore, Deeg does not anticipate the rejected claims in Group IA because Deeg fails to teach each and every element of the rejected claims, namely, front loading an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber.

The Examiner has also rejected the claims of this Group as being obvious over the Deeg patent. In making this rejection, the Examiner asserts that Deeg teaches or suggests every element of the claims.

In order to meet its burden in establishing a rejection under 35 U.S.C. § 103 the

Office must first demonstrate that the combined prior art references teach or suggest all the claimed limitations. See Pharmastem Therapeutics, Inc. v. Viacell, Inc., 491 F.3d 1342 (Fed. Cir. 2007) ("the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt to make [every element of] the composition or device, or carry out the [entire] claimed process, and would have had a reasonable expectation of success in doing so," (citing KSR Int'l Co. v. Teleflex Inc., 127 S. Ct. 1727, 1740 (2007))); and see Omegaflex, Inc. v. Parker-Hannifin Corp., 2007 U.S. App. LEXIS 14308 (Fed. Cir. 2007) ("[t]he Supreme Court recently explained that 'a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art,'" (citing KSR Int'l Co. at 1741)); and see Dystar Textilfarben GmbH v. C.H. Patrick Co., 464 F.3d 1356, 1360 (Fed. Cir. 2006) ("[once] all claim limitations are found in a number of prior art references, the factfinder must determine '[w]hat the prior art teaches, whether it teaches away from the claimed invention, and whether it motivates a combination of teachings from different references,'" (citing In re Fulton, 391 F.3d 1195, 1199-1200 (Fed. Cir. 2004))).

For the reasons detailed below, the Appellants submit that Deeg fails to make obvious the claimed invention. Specifically, the Appellants submit that Deeg fails to teach or suggest front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber, as is claimed.

As discussed above, Deeg does not teach this element, because nowhere does Deeg teach front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber.

Furthermore, Deeg does not suggest this element, because the inkjet head orifice of Deeg, in its normal and usual operation, is to load analytical liquid into "disposable jet units" (i.e., cartridges) "which contain the analytical liquid (especially reagents or calibrating liquids) in prepacked form" which are then associated with the inkjet head (column 2, lines 22 to 25). Deeg therefore actually teaches away from front

loading of fluid, because the method in Deeg is directed to the use of pre-packed, disposable units.

The Appellants maintain that "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. In re Ratti 123 USPQ 349 (CCPA 1959). If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon 221 USPQ 1125 (Fed. Cir. 1984).

The 'prepacked disposable units' as disclosed in Deeg could not be used with the front loading method of the current claims. Furthermore, a front loading method would defeat the stated purpose of using the prepacked disposable units in Deeg. As such, Deeg does not suggest the front loading step of the claimed methods.

Therefore, Deeg fails to make obvious the claims of this Group because Deeg fails to teach or suggest all the elements of the claimed invention, namely, Deeg fails to teach or suggest front loading an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber.

Group 1B: *Claims 2, 22, 24-28, 35*

As described above, independent Claim 1 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid in a manner so that the fluid flows through said orifice into the firing chamber, wherein the quantity of fluid is no more than about 5 μl; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a

manner that maintains the reagent's functionality.

Independent Claim 22 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the protein of interest is present in the fluid at a concentration that ranges from about 5 to 1000 μg/ml and the front loading comprises contacting the orifice with the fluid and applying back pressure to the head during the contacting in a manner so that the fluid flows through the orifice into the firing chamber; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

An element of the independent claims and the claims which depend from these independent claims is front loading a fluid into an inkjet head by contacting an orifice with the fluid and applying back pressure to the head during the contacting step.

The Examiner has rejected the claims of this Group as being anticipated by the Deeg patent. In making this rejection, the Examiner asserts that Deeg teaches or suggests every element of the claims.

For the reasons detailed below, the Appellants submit that Deeg fails to anticipate the claimed invention. Specifically, the Appellants submit that Deeg fails to teach, expressly or inherently, front loading a fluid into an inkjet head by contacting an orifice with the fluid and applying back pressure to the head during the contacting step, as is claimed.

In making the rejection, the Examiner alleges that "the instantly claimed "thermal inkjet head" used in printing ink or biological material, "in its normal and usual operation", would "necessarily perform" back or negative pressure to retain fluid in the nozzle and firing chamber". For example, Cowger, et al. (U.S. 5,409,134; 4/25/1995) teaches that "back pressure at the print head must be at all times strong enough for preventing ink leakage" and "a slight back pressure at the print head to prevent ink

leakage" in thermal inkjet heads (co. 1 of '134). Thus, thermal inkjet heads are known to operate under "back" or "negative" pressure in addition to the capillary force, so that the fluid or ink in contact with the orifice is suctioned in the head before ejection." (Final Office Action of 8-22-2007, p. 12)

However, the Appellants maintain that not only does Deeg not teach front loading fluid, as discussed above, but Deeg further does not teach the element of back pressure. Nowhere is there disclosed in Deeg the element of "back pressure". Even if, as the Examiner alleges, back pressure is "inherent", as the Examiner has stated, "the fluid or ink in contact with the orifice is suctioned in the head before ejection". In other words, the cited reference merely discloses suction to prevent leakage. Nowhere in the cited reference or in Deeg is the method of applying back pressure as a method of loading fluid during said contacting step.

The Appellants maintain that in order to anticipate, the prior art reference "must describe the applicant's claimed invention sufficiently to have placed a person of ordinary skill in the field of the invention in possession of it." In re Spada, 911 F.2d 705, 708, 15 U.S.P.Q.2d (BNA) 1655, 1657 (Fed. Cir. 1990).

Establishing inherency requires that the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. . . . Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." Continental Can Co. v. Monsanto Co., 948 F.2d 1264, 1268-69, 20 U.S.P.Q.2d (BNA) 1746, 1749 (Fed. Cir. 1991) (quoting In re Oelrich, 666 F.2d 578, 581, 212 U.S.P.Q. (BNA) 323, 326 (C.C.P.A. 1981). In relying on this theory of inherency, one must "provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inf. 1990).

The Appellants contend that the methods disclosed by Deeg describe a

traditional use of inkjet heads, where the fluid comes from a reservoir into the firing chamber. Nowhere does Deeg teach front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber. Because Deeg fails to teach front loading into an inkjet head, Deeg also fails to teach the element of back pressure.

Therefore, Deeg does not anticipate the rejected claims in Group 1B because Deeg fails to teach each and every element of the rejected claims, namely, applying back pressure to said head during said contacting step, because Deeg (1) does not teach a front loading contacting step; and (2) does not teach applying back pressure; and furthermore (3) does not teach applying back pressure during said contacting step.

The Examiner has also rejected the claims of Group 2B as being obvious over the Deeg patent. In making this rejection, the Examiner asserts that Deeg teaches or suggests every element of the claims.

As discussed above, Deeg does not teach the element of applying back pressure during to the head during the contacting step. Furthermore, Deeg does not suggest this element, because a front loading method would not allow for the use of the 'prepacked disposable units' as disclosed in Deeg. "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. In re Ratti 123 USPQ 349 (CCPA 1959). If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon 221 USPQ 1125 (Fed. Cir. 1984)." As such, Deeg does not suggest the front loading step of the claimed methods.

Therefore, Deeg fails to make obvious the claims of this Group because Deeg fails to teach or suggest all the elements of the claimed invention, namely, Deeg fails to teach or suggest front loading an inkjet head which further comprises applying back pressure to said head during said contacting step.

Group 1C: *Claims 6 and 23*

As described above, independent Claim 1 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid in a manner so that the fluid flows through said orifice into the firing chamber, wherein the quantity of fluid is no more than about 5 μl; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

Independent Claim 22 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the protein of interest is present in the fluid at a concentration that ranges from about 5 to 1000 μg/ml and the front loading comprises contacting the orifice with the fluid and applying back pressure to the head during the contacting in a manner so that the fluid flows through the orifice into the firing chamber; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

An element of the independent claims and the claims which depend from them is the method which further comprises washing the head following the actuating step.

The Examiner has rejected the claims of this Group as being anticipated by the Deeg patent. In making this rejection, the Examiner asserts that Deeg teaches or suggests every element of the claims.

For the reasons detailed below, the Appellants submit that Deeg fails to

anticipate the claimed invention. Specifically, the Appellants submit that Deeg fails to teach, expressly or inherently, the method of front loading a fluid into an inkjet head by contacting an orifice with the fluid, which further includes washing said head following said actuating step, as is claimed.

In making the rejection, the Examiner alleges that "the reference teaches washing steps consisting of metering tap water (reads on washing the head following actuating step as recited in clms 6, 12, 17, 23; See example 4 a)-h) of the reference)". (Final Office Action, p. 9)

The cited reference is shown below:

> a) Streptavidin-coated polystyrene tubes (manufactured according to EP-A-0344578) are used. 100 µl of sample or standard are metered into each tube.
> b) 10 µl of a conjugate solution which has been filtered on a 0.8 µm filter are applied using a printing head as in Examples 1–3. The conjugate solution contains 18 U/ml of a conjugate consisting of a monoclonal antibody directed against TSH (ECACC 87122202) and peroxidase in 80 mM sodium phosphate buffer (NaPB) pH 7.4.
> c) 1 min after delivery of the conjugate, 1 ml of incubation buffer (80 mM NaPB pH 7.4 with 1250 µg/ml of a biotinylated monoclonal antibody directed against TSH (ECACC 87122201), 2 g/l of bovine serum albumin and 1 g/l of bovine IgG) is metered via the metering unit of said system. (The biotinylation of the antibody was carried out in accordance with JACS 100 (1978, 3585–3590) by reaction with N-hydroxysuccinimidobiotin in a ratio of 10:1.)
> d) The mixture is then incubated for 60 min.
> e) Five washing steps, each consisting of aspiration of the reagent solution and metering of tap water, are carried out with the metering unit of the system used.
> f) 1 ml of Enzymun-ABTS ® substrate solution is metered, again via the metering unit.
> g) The mixture is incubated for 30 min.
> h) The extinction of the substrate solution is measured at 405 nm using the system's photometric measuring device.

The Appellants point out that the washing steps in step e), "...are carried out with the metering unit of the system..."

Figure 2 of Deeg is reproduced below for convenience:

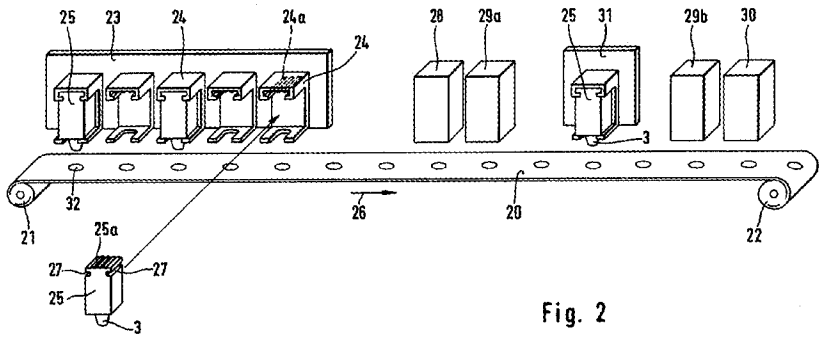


Fig. 2

As shown above, metering unit 28 is a separate element from jet unit 25. The method in Deeg involves applying a solution using "a printing head" (jet unit 25 above), followed by "washing steps", carried out with metering unit 28. In other words, the washing steps are done with metering unit 28, not jet unit 25. There is no disclosure in Deeg of "washing the head following the actuating step" because the 'washing' in Deeg is done with metering unit 28.

Therefore, Deeg does not anticipate the rejected claims in Group 1C because Deeg fails to teach each and every element of the rejected claims, namely, washing said head following said actuating step.

The Examiner has also rejected the claims of Group 1C as being obvious over the Deeg patent. In making this rejection, the Examiner asserts that Deeg teaches or suggests every element of the claims.

As discussed above, Deeg does not teach the element of washing said head following said actuating step. Furthermore, Deeg does not suggest this element, because as above, the washing step in Deeg given by the Examiner is performed with metering unit 28. Additionally, Deeg further discloses: "[w]here necessary, washing

steps can be carried out with the wash units 29a and 29b"(col. 4, lines 48-49) thereby actually teaching away from washing the head, because Deeg discloses that washing steps can be carried out with metering unit 28, or with separately provided wash units 29a and 29b. There is therefore no teaching or suggestion in Deeg of "washing said head following said actuating step" as in the current claims.

Therefore, Deeg fails to make obvious the claims of this Group because Deeg fails to teach or suggest all the elements of the claimed invention, namely, Deeg fails to teach or suggest washing said head following said actuating step.

Group 1D: *Claims 12-21*

Independent Claim 12 is drawn to a method for depositing a quantity of fluid containing a protein reagent binding pair member onto a substrate surface, the method comprising front loading less than about 5 μl of the fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid and applying back pressure to the head during the contacting in a manner so that the fluid flows through said orifice into the firing chamber; positioning the loaded thermal inkjet head loaded with the fluid in opposing relation to the surface; actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality; and washing the head.

Independent Claim 17 is drawn to a method of a method for depositing a quantity of fluid containing an enzyme reagent onto a surface of a substrate, said method comprising front loading less than about 5 μl of the fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid and applying back pressure to the head during the contacting in a manner so that the fluid flows through the orifice into the firing chamber; positioning the loaded thermal inkjet head loaded with the fluid in opposing relation to the surface; actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality; and washing the head.

An element of the independent claims and the claims which depend from them is front loading a fluid into an inkjet head by contacting an orifice with the fluid and applying back pressure to the head during the contacting step, and washing the head.

The Examiner has rejected the claims of this Group as being anticipated by the Deeg patent. In making this rejection, the Examiner asserts that Deeg teaches or suggests every element of the claims.

For the reasons detailed below, the Appellants submit that Deeg fails to anticipate the claimed invention. Specifically, the Appellants submit that Deeg fails to teach, expressly or inherently, front loading a fluid into an inkjet head by contacting an orifice with the fluid and applying back pressure to the head during the contacting step, and washing said head, as is claimed.

In making the rejection, the Examiner alleges that as discussed above, "thermal inkjet heads are known to operate under "back" or "negative" pressure in addition to the capillary force, so that the fluid or ink in contact with the orifice is suctioned in the head before ejection." (Final Office Action of 8-22-2007, p. 12)

However, the Appellants again maintain that not only does Deeg not teach front loading fluid, but Deeg further does not teach the element of back pressure, as discussed above. Nowhere in Deeg is there the element of "back pressure". Even if, as the Examiner alleges, back pressure is "inherent", as the Examiner has stated, "the fluid or ink in contact with the orifice is suctioned in the head before ejection". In other words, the cited reference merely discloses suction to prevent leakage. Nowhere in the cited reference or in Deeg is the method of applying back pressure as a method of loading fluid during said contacting step.

The Appellants again maintain that establishing inherency requires that the extrinsic evidence “must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. . . . Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given

set of circumstances is not sufficient." *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268-69, 20 U.S.P.Q.2d (BNA) 1746, 1749 (Fed. Cir. 1991) (quoting *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. (BNA) 323, 326 (C.C.P.A. 1981). In relying on this theory of inherency, one must "provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inf. 1990).

The Appellants maintain that Deeg does not disclose applying back pressure to an inkjet head during the contacting step. The methods disclosed by Deeg describe a traditional use of inkjet heads, where the fluid comes from a reservoir into the firing chamber, and therefore fluid does not go from the orifice into the firing chamber. The Appellants maintain that nowhere does Deeg teach front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber.

Therefore, Deeg does not anticipate the rejected claims in Group 1D because Deeg fails to teach each and every element of the rejected claims, namely, applying back pressure to said head during said contacting step, because Deeg (1) does not teach a front loading contacting step; and (2) does not teach applying back pressure; and furthermore (3) does not teach applying back pressure during said contacting step.

Additionally, as discussed above, the Examiner also alleges that "the reference teaches washing steps consisting of metering tap water (reads on washing the head following actuating step as recited in clms 6, 12, 17, 23; See example 4 a)-h) of the reference)". (Final Office Action, p. 9)

However, as cited above, the reference in Deeg states that the washing steps "...are carried out with the metering unit of the system..." (col. 8, lines 35-36) As shown in Fig. 2 above, metering unit 28 is a separate element from jet unit 25. The method in Deeg involves applying a solution using "a printing head" (jet unit 25 above), followed by "washing steps", carried out with metering unit 28. In other words, the washing steps

are done with metering unit 28, not jet unit 25. There is no disclosure in Deeg of "washing the head" following the actuating step because the 'washing' in Deeg is done with metering unit 28.

Therefore, Deeg does not anticipate the rejected claims in Group 1D because not only does Deeg fail to teach applying back pressure during said contacting step, Deeg also fails to teach washing said head following said actuating step. Accordingly, because Deeg fails to teach each and every element of the rejected claims, namely, applying back pressure during said contacting step and washing said head following said actuating step, Deeg fails to anticipate the claims of Group 1D.

The Examiner has also rejected the claims of Group 1D as being obvious over the Deeg patent. In making this rejection, the Examiner asserts that Deeg teaches or suggests every element of the claims.

As discussed above, Deeg does not teach the element of applying back pressure during to the head during the contacting step. Furthermore, Deeg does not suggest this element, because a front loading method would not allow for the use of the 'prepacked disposable units' as disclosed in Deeg. "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti* 123 USPQ 349 (CCPA 1959). If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon* 221 USPQ 1125 (Fed. Cir. 1984)." As such, Deeg does not suggest the front loading step of the claimed methods.

Additionally, as discussed above, Deeg does not teach the element of washing said head following said actuating step. Deeg also does not suggest this element, because as above, the washing step in Deeg given by the Examiner is performed with metering unit 28. Deeg further discloses: "[w]here necessary, washing steps can be carried out with the wash units 29a and 29b"(col. 4, lines 48-49) thereby actually

teaching away from washing the head, because Deeg discloses that washing steps can be carried out with metering unit 28, or with separately provided wash units 29a and 29b. There is therefore no teaching or suggestion in Deeg of "washing said head" following said actuating step as in the current claims.

Therefore, Deeg fails to make obvious the claims of this Group because Deeg fails to teach or suggest all the elements of the claimed invention, namely, Deeg fails to teach or suggest front loading an inkjet head which further comprises applying back pressure to said head during said contacting step, and Deeg also fails to teach or suggest washing said head following said actuating step.

Accordingly, in view of the above arguments, the Appellants respectfully request that both the 35 U.S.C. § 102(b) rejection and the 35 U.S.C. § 103(a) rejection of Claims 1, 2, 4-10, 12-28, and 35 over Deeg et al. (U.S.P.N. 5,338,688) be withdrawn.

IV. Claims 1, 2, and 9 are not unpatentable over Claims 19-21 and 23 of Caren et al. (U.S. Patent 6,797,469).

In the arguments set forth below, the Appellants will argue the rejected claims in one group.

As described above, independent Claim 1 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid in a manner so that the fluid flows through said orifice into the firing chamber, wherein the quantity of fluid is no more than about 5 μl; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

An element of the rejected claims includes a method for depositing a quantity of

a fluid containing a protein reagent onto the surface of a substrate in a manner that retains the reagent's functionality.

The Examiner has rejected the claims of this Group as being unpatentable over Claims 19-21 and 23 of the Caren '469 patent. In making this rejection, the Examiner asserts that '469 teaches each and every element of the claims.

For the reasons detailed below, the Appellants submit that '469 fails to make obvious the claimed invention. Specifically, the Appellants submit that '469 fails to teach, either expressly or inherently, the method of depositing a quantity of fluid containing a protein reagent, as is claimed.

In making the rejection, the Examiner asserts that "[t]he reference further teaches the deposit fluid comprises binding agents (a member of a specific binding pair) such as proteins and (e.g. Claim 19; Column 2, lines 31+; col. 4 lines 33+,) which reads on the protein reagent of clms 1, 7, 8, 12, 17, 22, 24, 25, and 36-38." (Advisory Action, p. 4).

However, again the Appellants respectfully disagree. As discussed above, Caren '469 is directed to deposition of sample, not reagent, on an array. The cited portions of Caren '469 are directed to screening a fluid sample for the presence of an analyte in a sample; specifically a nucleic acid. As described in the specification, "[T]he fluid sample that is deposited on the array according to the subject invention is a fluid sample that is suspected of containing an analyte of interest. In other words, the fluid sample may or may not actually contain the analyte of interest" (col. 4, lines 14-18). It is therefore not a protein reagent as claimed.

As discussed above, a reagent is defined as a substance used in a chemical reaction to detect, measure, examine, or produce other substances. In other words, a reagent as in the current claims is a substance, for example, used to detect the presence of a nucleic acid. This is in contrast to an analyte, (e.g. a nucleic acid) which is "a substance or chemical constituent that is undergoing analysis" (American Heritage Stedmans Medical Dictionary), e.g. a substance that is detected. The Examiner has not

pointed to where '469 discloses deposition of a reagent. Nowhere does Caren '469 disclose deposition of a protein reagent onto a substrate in a manner that maintains the reagent's functionality.

As discussed above, none of the Examiner's references cited above disclose deposition of a protein reagent onto a substrate. Claim 19 of Caren '469 is directed to "a method for depositing a quantity of fluid containing a nucleic acid or polypeptide onto an array surface having a plurality of nucleic acids or polypeptides stably associated therewith...." Col. 2, lines 31+ defines the term "binding agent"; and Col. 4, lines 33+, discloses that "[t]he fluid sample is generally derived from a physiological fluid, e.g. naturally occuring fluids, such as plasma, tears, urine, etc., derivatives of cells or tissues, e.g. cell lysates, etc., where the fluid may or may not be pre-treated to produce the sample". There is no disclosure in Caren '469 of deposition of a protein reagent onto a substrate. The Appellants therefore fail to see how these references support the Examiners assertion that '469 contains the element of depositing a reagent.

In contrast to the current claims, Caren '469 is directed to deposition of sample, not reagent, on an array. The deposition of sample on an array in Caren '469 is for detection of the presence of an analyte in a sample. As described in the specification, "[T]he fluid sample that is deposited on the array according to the subject invention is a fluid sample that is suspected of containing an analyte of interest. In other words, the fluid sample may or may not actually contain the analyte of interest, where the purpose of the array-based assays in which the methods of the subject invention find use is to determine whether or not the sample has the analyte of interest." (col. 4, lines 10-17). A sample to be assayed is not a protein reagent as claimed.

Therefore, because Caren '469 does not teach the method of depositing a quantity of fluid containing a protein reagent of interest onto a surface of a substrate, Caren '469 does not make obvious the rejected claims.

In view of the arguments above, the Appellants submit that the teachings of Caren '469 fail to meet the requirements for a nonstatutory obviousness-type double-

patenting rejection, and respectfully request reversal of this rejection.

V. Claims 1, 2, and 9 are not unpatentable over Claims 1, 3, 5-7, 9, 10, 12, 17, and 19 of Caren et al. (U.S. Patent 6,221,653).

In the arguments set forth below, the Appellants will argue the rejected claims in one group.

As described above, independent Claim 1 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid in a manner so that the fluid flows through said orifice into the firing chamber, wherein the quantity of fluid is no more than about 5 μl; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

An element of the rejected claims include a method for depositing a quantity of a fluid containing a protein reagent onto the surface of a substrate, in manner that retains the reagent's functionality.

The Examiner has rejected the claims of this Group as being unpatentable over Claims 1, 3, 5-7, 9, 10, 12, 17, and 19 of the Caren '653 patent.

For the reasons detailed below, the Appellants submit that '653 fails to make obvious the claimed invention. Specifically, the Appellants submit that '653 fails to teach, either expressly or inherently, the method of depositing a quantity of fluid containing a protein reagent onto a surface of a substrate, as is claimed.

In making this rejection, the Examiner states that Caren '653 teaches "the deposit fluid comprises binding agents (a member of a specific binding pair) such as proteins, enzymes and cell lysates (containing essentially protein mixtures) (e.g. Claim

3; Column 2, lines 28+; col. 4 lines 27+) which reads on the protein reagent of clms 1, 7, 8, 12, 17, 22, 24, 25, and 36, 38." (Advisory Action, p. 2).

However, as discussed in the previous response, the above cited sections by the Examiner demonstrate that the fluid sample in Caren '653 is one that is suspected of containing an analyte of interest; i.e., a fluid sample that may or may not actually contain the analyte of interest. It is not a protein reagent as claimed.

The Examiner has not pointed to where '653 discloses deposition of a reagent. Nowhere does Caren '653 disclose deposition of a protein reagent onto a substrate; i.e., a substance used in a chemical reaction to detect, measure, examine, or produce other substances, in a manner that maintains said reagent's functionality.

As discussed above, none of the Examiner's cited references disclose deposition of a reagent onto a substrate. Claim 3 refers to a method for depositing a quantity of fluid on a substrate, wherein the fluid is a biomolecule. Col. 2, defines the term "binding agent" on the array; and Col. 4, lines 27+, discloses that "[t]he fluid sample is generally derived from a physiological fluid, e.g. naturally occuring fluids, such as plasma, tears, urine, etc., derivatives of cells or tissues, e.g. cell lysates, etc., where the fluid may or may not be pre-treated to produce the sample". There is no disclosure in Caren '653 of deposition of a protein reagent onto a substrate. The Appellants therefore fail to see how these references support the Examiners assertion that '653 contains the element of depositing a reagent.

In contrast to the current claims, Caren '653 is directed to deposition of sample, not reagent, on an array. The deposition of sample on an array in Caren '653 is for detection of the presence of an analyte in a sample. As described in the specification, "[T]he fluid sample that is deposited on the array according to the subject invention is a fluid sample that is suspected of containing an analyte of interest. In other words, the fluid sample may or may not actually contain the analyte of interest, where the purpose of the array-based assays in which the methods of the subject invention find use is to determine whether or not the sample has the analyte of interest." (col. 4, lines 10-17).

A sample to be assayed is not a protein reagent as claimed.

Therefore, because Caren '653 does not teach the method of depositing a quantity of fluid containing a protein reagent of interest onto a surface of a substrate, Caren '653 does not make obvious the rejected claims.

In view of the arguments above, the Appellants submit that Caren '653 fails to meet the requirements for a nonstatutory obviousness-type double-patenting rejection, and respectfully request reversal of this rejection.

VI. Claims 1, 2, and 9 are not unpatentable over Claims 1, 5, 9, 11-13, 15, and 18 of Caren et al. (U.S. Patent 6,656,740).

In the arguments set forth below, the Appellants will argue the rejected claims in one group.

As described above, independent Claim 1 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid in a manner so that the fluid flows through said orifice into the firing chamber, wherein the quantity of fluid is no more than about 5 μl; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

An element of the rejected claims include a method for depositing a quantity of a fluid containing a protein reagent onto the surface of a substrate, in manner that retains the reagent's functionality.

The Examiner has rejected the claims of this Group as being obvious over Claims 1, 5, 9, 11-13, 15, and 18 of the Caren '740 patent.

The Examiner states that the '740 patent claims depositing "biopolymer fluid" (see Claim 1 of '740 for example) which the biopolymer fluid read on the "fluid containing a protein reagent" because the '740 defines the term "biopolymer" to include protein." (Advisory Action, p. 11)

However, the Appellants again assert that the claims of Caren '740 are directed to a method of fabricating an array of biopolymers by in-situ synthesis. In other words, Caren '740 is directed to fabricating, i.e., "building" a feature or "spot" on an array using an in-situ method. Multiple iterative steps are performed in order to form the final 'features' on the array.

This is in contrast to the current claims, in which a protein reagent is deposited in a manner that maintains the reagent's functionality. That is, an entire protein reagent is deposited onto the surface of a substrate in a functional form. This is clearly distinguished from a method of building a biopolymer through a multiple step process until a final feature or spot on an array is created.

Accordingly, the Appellants contend that the requirements for a nonstatutory obviousness-type double-patenting rejection have not been met, because Caren '740 fails to teach each and every element of the claims, namely, depositing a protein reagent onto a surface of a substrate in a manner that maintains the reagent's functionality.

In view of the arguments above, the Appellants submit that the teachings of Caren '740 fail to meet the requirements for a nonstatutory obviousness-type double-patenting rejection, and respectfully request reversal of this rejection.

VII. Claims 1, 2, 6, 7, and 8 are not unpatentable over Claims 1-5, 7, and 11-19 of Caren et al. (U.S. Patent 6,323,043) and Claims 1, 2, 4, and 6 of Caren et al. (U.S. Patent 6,884,580)

In the arguments set forth below, the Appellants will argue the rejected claims in

Groups as follows:

Group 2A: Claims 1, 2, 6, 7

Group 2B: Claim 8

Group 2A: Claims 1, 2, 6, 7

As described above, independent Claim 1 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid in a manner so that the fluid flows through said orifice into the firing chamber, wherein the quantity of fluid is no more than about 5 μl; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

An element of the rejected claims includes a method for depositing a quantity of a fluid containing a protein reagent onto the surface of a substrate, in manner that retains the reagent's functionality.

The Examiner has rejected the claims of this Group as being unpatentable over Claims 1-5, 7, and 11-19 of Caren '043, and Claims 1, 2, 4, and 6 of Caren '580.

In making this rejection, the Examiner states that the '043 patent claims "depositing "biopolymer fluid" (see Claim 1 of '043; Claim 1 of '580, for examples), which the biopolymer fluid read on the "fluid containing a protein reagent" because the '043 defines the term "biopolymer" to include protein (see, '043, col. 5, lines 60+)" (Advisory Action, p. 11)

However, the Appellants again assert that the claims of Caren '043 and Caren '580 are directed to a method of fabricating an array of biopolymers by in-situ synthesis.

In other words, Caren '043 and Caren '580 are directed to fabricating, i.e., "building" a feature or "spot" on an array using an in-situ method. Multiple iterative steps are performed in order to form the final features on the array. This is in contrast to the current claims, in which a protein reagent is deposited in a manner that maintains the reagent's functionality. That is, an entire protein reagent is deposited onto the surface of a substrate in a functional form. This is clearly distinguished from a method of building a biopolymer through a multiple step process until a final feature or spot on an array is created.

Accordingly, the Appellants submit that Caren '043 and Caren '580 do not make obvious the rejected claims, because Caren '043 and '580 fail to teach each and every element of the claims, namely, depositing a protein reagent in a manner that maintains the reagent's functionality.

Group 2B: Claim 8

As described above, independent Claim 1 is drawn to a method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid in a manner so that the fluid flows through said orifice into the firing chamber, wherein the quantity of fluid is no more than about 5 μl; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

An element of rejected dependent Claim 8 includes a method for depositing a quantity of a fluid containing a protein reagent onto the surface of a substrate, in manner that retains the reagent's functionality, wherein the protein of interest is an enzyme.

The claims of Caren '043 and related application '580 are directed to a method of fabricating an array of biopolymers by in-situ synthesis. In other words, Caren '043 and Caren '580 are directed to fabricating, i.e., "building" a feature or "spot" on an array using an in-situ method. Multiple iterative steps are performed in order to form the final features on the array. This is in contrast to the current claims, in which a protein reagent is deposited in a manner that maintains the reagent's functionality. That is, an entire protein reagent is deposited onto the surface of a substrate in a functional form. This is clearly distinguished from a method of building a biopolymer through a multiple step process until a final feature or spot on an array is created.

Additionally, Caren '043 and Caren '580 do not contain the element of depositing an "enzyme", and therefore they do not anticipate the current claims, which contain the element of a depositing a protein reagent onto the surface of a substrate, in manner that retains the reagent's functionality, wherein said protein of interest is an enzyme.

Accordingly, the Appellants submit that Caren '043 and Caren '580 do not make obvious the rejected claims, because Caren '043 and '580 fail to teach each and every element of the claims, namely, depositing an enzyme reagent in a manner that maintains the reagent's functionality.

In view of the arguments above, the Appellants submit that the teachings of Caren '043 and Caren '580 fail to meet the requirements for a nonstatutory obviousness-type double-patenting rejection, and respectfully request reversal of this rejection.

VIII. Claims 1,2, and 4 are not unpatentable over Claims 1, 3, 8, 12, 14, 15, and 18 of Schleifer et al. (U.S. Patent 6,242,266).

In the arguments set forth below, the Appellants will argue the rejected claims in a single group.

As described above, independent Claim 1 is drawn to a method for depositing a

quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, the method comprising front loading the quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein the front loading comprises contacting the orifice with the fluid in a manner so that the fluid flows through said orifice into the firing chamber, wherein the quantity of fluid is no more than about 5 μl; positioning the loaded thermal inkjet head in opposing relation to the surface; and actuating the thermal inkjet head to deposit the quantity of fluid onto the surface in a manner that maintains the reagent's functionality.

An element of the rejected claims includes a method for depositing a quantity of a fluid containing a protein reagent onto the surface of a substrate, in manner that retains the reagent's functionality.

The Examiner has rejected the claims of this Group as being unpatentable over Claims 1, 3, 8, 12, 14, 15, and 18 of Schleifer et al. ('266)

In making the rejection, the Examiner alleges that the '266 patent claims depositing "biopolymer fluid". (Advisory Action, p. 12). However, the Appellants again assert that the claims of Schleifer '266 are directed to a method of fabricating an array of biopolymers by in-situ synthesis. In other words, Schleifer '266 is directed to fabricating, i.e., "building" a feature or "spot" on an array using an in-situ method. Multiple iterative steps are performed in order to form the final features on the array.

This method is in contrast to the current claims, in which a protein reagent is deposited in a manner that maintains the reagent's functionality. That is, an entire protein reagent is deposited onto the surface of a substrate in a functional form. This is clearly distinguished from a method of building a biopolymer through a multiple step process until a final feature or spot on an array is created.

Accordingly, the Appellants contend that the requirements for a nonstatutory obviousness-type double-patenting rejection have not been met, because Schleifer '266 fails to teach each and every element of the claims, namely, depositing a protein reagent in a manner that maintains the reagent's functionality.

In view of the arguments above, the Appellants submit that the teachings of Schleifer '266 fail to meet the requirements for a nonstatutory obviousness-type double-patenting rejection, and respectfully request reversal of this rejection.

SUMMARY

I. Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 are not anticipated under 35 U.S.C. § 102(a) and 35 U.S.C. § 102(e) by Caren et al. (U.S. Patent 6,221,653) because Caren '653 fails to teach or suggest, either expressly or inherently, deposition of a protein reagent onto a substrate in a manner that maintains said reagents functionality.

II. Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 are not anticipated under 35 U.S.C. § 102(e) by Caren et al. (U.S. Patent 6,797,469) because Caren fails to teach or suggest, either expressly or inherently, deposition of a protein reagent onto a substrate in a manner that maintains said reagents functionality.

III. Claims 1, 2, 4-10, 12-28, and 35-39 are not anticipated under 35 U.S.C. § 102(b) by, or alternatively, are not obvious under 35 U.S.C. § 103(a) over Deeg et al. (U.S. Patent 5,338,688), BECAUSE Deeg fails to teach or suggest the method of front loading the inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber.

IV. Claims 1, 2, and 9 are not unpatentable over Claims 19-21 and 23 of Caren et al. (U.S. Patent 6,797,469) in a nonstatutory obviousness-type double-patenting rejection because Caren '469 does not disclose deposition of a protein reagent onto a substrate, in a manner that retains said reagent's functionality.

V. Claims 1, 2, and 9 are not unpatentable over Claims 1, 3, 5-7, 9, 10, 12, 17, and 19 of Caren et al. (U.S. Patent 6,221,653) a nonstatutory obviousness-type double-patenting rejection because Caren '653 does not disclose deposition of a protein reagent onto a substrate, in a manner that retains said reagent's functionality.

VI. Claims 1, 2, and 9 are not unpatentable over Claims 1, 5, 9, 11-13, 15, and 18 of Caren et al. (U.S. Patent 6,656,740) because Caren '740 does not disclose deposition of a protein reagent onto a substrate, in a manner that retains said reagent's functionality.

VII. Claims 1, 2, 6, 7, and 8 are not unpatentable over Claims 1-5, 7, and 11-19 of Caren et al. (U.S. Patent 6,323,043) and Claims 1, 2, 4, and 6 of Caren et al. (U.S. Patent 6,884,580) because Caren '043 and Caren '580 do not disclose deposition of a protein reagent onto a substrate, in a manner that retains said reagent's functionality.

VIII. CLAIMS 1,2, and 4 are not unpatentable over Claims 1, 3, 8, 12, 14, 15, and 18 of Schleifer et al. (U.S. Patent 6,242,266) because Schleifer '266 do not disclose deposition of a protein reagent onto a substrate, in a manner that retains said reagent's functionality.

RELIEF REQUESTED

The Appellants respectfully request that the rejection of Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 under 35 U.S.C. § 102 (a) and 35 U.S.C. § 102(e), the rejection of Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 under 35 U.S.C. § 102 (e), the rejection of Claims 1, 2, 4-10, 12-28, and 35-39 under 35 U.S.C. § 102(b) by, or alternatively, under 35 U.S.C. § 103(a), the rejection of Claims 1, 2, and 9 under a nonstatutory obviousness-type double-patenting rejection over Caren et al. (U.S. Patent 6,797,469), the rejection of Claims 1, 2, and 9 under a nonstatutory obviousness-type double-patenting rejection over Caren et al. (U.S. Patent 6,221,653), the rejection of Claims 1, 2, and 9 under a nonstatutory obviousness-type double-patenting rejection over Caren et al. (U.S. Patent 6,656,740), the rejection of Claims 1, 2, 6, 7, and 8 under a nonstatutory obviousness-type double-patenting rejection over Caren et al. (U.S. Patent 6,323,043) and Caren et al. (U.S. Patent 6,884,580), and the rejection of Claims 1, 2, and 4 under a nonstatutory obviousness-type double-patenting rejection over Schleifer et al. (U.S. Patent 6,242,266) be reversed, and that the application be remanded to the Examiner with instructions to issue a Notice of Allowance.

Respectfully submitted,

Date: April 11, 2008

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CLAIMS APPENDIX

1. A method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, said method comprising:

(a) front loading said quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein said front loading comprises contacting said orifice with said fluid in a manner so that said fluid flows through said orifice into said firing chamber, wherein said quantity of fluid is no more than about 5 μl;

(b) positioning said loaded thermal inkjet head in opposing relation to said surface; and

(c) actuating said thermal inkjet head to deposit said quantity of fluid onto said surface in a manner that maintains said reagent's functionality.

2. The method according to Claim 1, wherein said method further comprises applying back pressure to said head during said contacting step.

4. The method according to Claim 1, wherein no more than about 2 μl of fluid is loaded into said head during said loading step.

5. The method according to Claim 1, wherein said protein of interest is present in said fluid at a concentration that ranges from about 5 to 1000 μg/ml.

6. The method according to Claim 1, wherein said method further comprises washing said head following said actuating step (c).

7. The method according to Claim 1, wherein said protein of interest is a member of a specific binding pair.

8. The method according to Claim 1, wherein said protein of interest is an enzyme.

9. The method according to Claim 1, wherein said surface is a surface of a planar substrate.

10. The method according to Claim 1, wherein said surface is a surface of a reagent chamber.

12. A method for depositing a quantity of fluid containing a protein reagent binding pair member onto a substrate surface, said method comprising:

(a) front loading less than about 5 μl of said fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein said front loading comprises contacting said orifice with said fluid and applying back pressure to said head during said contacting in a manner so that said fluid flows through said orifice into said firing chamber;

(b) positioning said loaded thermal inkjet head loaded with said fluid in opposing relation to said surface;

(c) actuating said thermal inkjet head to deposit said quantity of fluid onto said surface in a manner that maintains said reagent's functionality; and

(d) washing said head.

13. The method according to Claim 12, wherein no more than about 2 μl of fluid is loaded into said head during said loading step.

14. The method according to Claim 12, wherein said protein binding pair member is present in said fluid at a concentration ranging from about 5 to 1000 μg/ml.

15. The method according to Claim 12, wherein said surface is a surface of a planar support.

16. The method according to Claim 12, wherein said surface is a surface of a reagent chamber.

17. A method for depositing a quantity of fluid containing an enzyme reagent onto a surface of a substrate, said method comprising:

(a) front loading less than about 5 μl of said fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein said front loading comprises contacting said orifice with said fluid and applying back pressure to said head during said contacting in a manner so that said fluid flows through said orifice into said firing chamber;

(b) positioning said loaded thermal inkjet head loaded with said fluid in opposing relation to said surface;

(c) actuating said thermal inkjet head to deposit said quantity of fluid onto said surface in a manner that maintains said reagent's functionality; and

(d) washing said head.

18. The method according to Claim 17, wherein no more than about 2 μl of fluid is loaded into said head during said loading step.

19. The method according to Claim 17, wherein said enzyme is present in said fluid at a concentration ranging from about 5 to 1000 μg/ml.

20. The method according to Claim 17, wherein said surface is a surface of a planar substrate.

21. The method according to Claim 17, wherein said surface is a surface of a reagent chamber.

22. A method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, said method comprising:

(a) front loading said fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein said protein of interest is present in said fluid at a

concentration that ranges from about 5 to 1000 μg/ml and said front loading comprises contacting said orifice with said fluid and applying back pressure to said head during said contacting in a manner so that said fluid flows through said orifice into said firing chamber;

(b) positioning said loaded thermal inkjet head in opposing relation to said surface; and

(c) actuating said thermal inkjet head to deposit said quantity of fluid onto said surface in a manner that maintains said reagent's functionality.

23. The method according to Claim 22, wherein said method further comprises washing said head following said actuating step (c).

24. The method according to Claim 22, wherein said protein of interest is a member of a specific binding pair.

25. The method according to Claim 22, wherein said protein of interest is an enzyme.

26. The method according to Claim 22, wherein said surface is a surface of a planar substrate.

27. The method according to Claim 22, wherein said surface is a surface of a reagent chamber.

28. The method according to Claim 22, wherein said deposited quantity does not exceed about 200 picolitres.

35. A method according to Claim 2, wherein said back pressure comprises negative pressure.

36. The method according to Claim 1, wherein said fluid consists essentially of

said protein reagent.

37. The method according to Claim 12, wherein said fluid consists essentially of said protein reagent binding pair member.

38. The method according to Claim 17, wherein said fluid consists essentially of said enzyme reagent.

39. The method according to Claim 22, wherein said fluid consists essentially of said protein reagent.

EVIDENCE APPENDIX

No evidence that qualifies under this heading has been submitted during the prosecution of this application, and as such it is left blank.

RELATED PROCEEDINGS APPENDIX

As stated in the *Related Appeals and Interferences* section above, there are no other appeals or interferences known to Appellants, the undersigned Appellants' representative, or the assignee to whom the inventors assigned their rights in the instant case, which would directly affect or be directly affected by, or have a bearing on the Board's decision in the instant appeal. As such this section is left blank.